

## Technical Circular 10-02

# Engine Conservation

Affected engines:

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> MAG 24.4 X 41XA | <input checked="" type="checkbox"/> MAH 33.3 TI 311A            |
| <input checked="" type="checkbox"/> MAG 33.3 X 31XA | <input checked="" type="checkbox"/> MAH 49.4 TI 211A            |
| <input checked="" type="checkbox"/> MAG 49.4 X 21XA | <input checked="" type="checkbox"/> MAG 74.6 TI 211A            |
| <input checked="" type="checkbox"/> MAG 74.6 X 21XA | <input checked="" type="checkbox"/> MAG 84.6 TI 211A            |
| <input checked="" type="checkbox"/> MAG 84.6 X 21XA | <input checked="" type="checkbox"/> Customised special versions |
| <input checked="" type="checkbox"/> MAG 13.6 X 11XA |   |

### 1. General

This circular describes the preservation scripts for storage and decommissioning of gas engines. Older technical circulars lose their validity with this version.

New engines are preserved before factory shipment. The duration of the preservation depends on the packaging and the storage conditions at the place of installation and will last a maximum of 6 months.

With engines a differentiation is made between

- Interior conservation and
- Exterior conservation

The following measures for the preservation after the engine has been taken out of service or when re-conserving engines that have not yet been put into operation meet the requirements for a protection period of 12 months.

After completion of the preservation work, the crank drive may not be turned any more, so that the preservative in the bearings, bearing bushes and cylinder liners is not stripped off.

## 2. Conservation of used engines

### 2.1. Interior conservation

Interior conservation is basically achieved by wetting the wall as a result of the preservative used (see section 5) with a conservation run of the motor.

#### **Lubricating oil system**

These include oil pan, lubricating oil pump, lubricating oil cooler, oil pressure valve, oil filter, main oil channel, crankshaft, connecting rod and camshaft bearings, tappet and tappet chambers, cylinder liners, valve springs and rocker arms.

- Drain lubricating oil when the engine is at operating temperature.
- Thoroughly clean engine compartment, oil pan, cylinder head with rocker arms, valves, valve springs with distillate fuel or cleaning agent.
- Fill the engine with SAE 30W-30 preservative oil and carry out a preservation run (running time approx. 10 minutes) so that all bearings and bearing bushes are wetted, or wet all components with preservative oil and pump preservative oil through the engine with a separate pump until all bearings and bearing bushes are wetted.

In auxiliary equipment with its own oil filling (this includes exhaust gas turbochargers, regulators etc.) drain lubricating oil and fill in new lubricating oil according to manufacturer's instructions.

#### **Coolant system**

If a cooling system protection agent is filled in, which has preservative properties, no further action is necessary after draining the coolant.

If this is not the situation, drain the coolant and carry out a conservation run with a mixture of corrosion inhibitor with conservation properties (see section x) and clean water to form a topcoat on the inner surfaces of the cooling system.

The duration of the conservation run and concentration of the corrosion protection agent must be carried out according to the manufacturer's instructions for the corrosion protection agent.

Drain the coolant afterwards.

**Combustion chamber**

After the conservation run, the spark plugs must be removed. The respective piston has to be brought to UT.

Through the opening, the accessible part of the cylinder liner is to be wetted with preservation oil using a spray lance.

+ Oil spills on the pistons are not permitted! Suction them off if necessary.

**Intake air system, receiver tube**

Spray running-in preservative oil 30 W-30 into the receiver pipe and into the main starting pipe.

+ Oil spills in pipes are not permitted, if necessary suck them off.

## 2.2. External conservation

The motor must be thoroughly cleaned with detergent before the exterior conservation. Any corrosion deposits and paint damage must be removed. For conservation and cleaning agents see section 5.

### **Bare outer surfaces and parts**

Coat or spray all bare spots with preservative.

Coat the crankshaft flange with preservative and wrap or cover tightly with foil or packing linen.

### **Control linkage and joints**

Coat control rods and joints with grease against corrosion.

### **Rubber parts**

Rub rubber parts with talcum powder.

+ Rubber parts must not come into contact with oil, grease or paint.

### **Engine openings**

All engine openings must be covered with air- and watertight covers to delay the volatilisation process of the preservatives.

The air inlet must be shut off to prevent the motor from being ventilated (chimney effect).

## 2.3. Storage and packaging

After preservation, the motor must be stored in a dry, ventilated hall or covered with a suitable cover. This must lie loosely against the motor so that the air can circulate around the motor so that no condensation can form. Use desiccant if necessary.

### 3. Post-conservation of engines

If the maximum protection period of the preservation is reached and the motor is to be stored further, it must be subjected to a subsequent preservation. The re-conservation protects the motor for another 12 months. A re-conservation is to be carried out for stored spare parts accordingly.

Mark the position of the flywheel or the crankshaft flange. In the area of the piston rings, projections can form on the cylinder liner. For this reason, a different piston position should be observed after each conservation.

Remove the packing of the motor and the covers of the motor openings.

#### 3.1. Interior conservation

##### **Lubricating oil system**

These include oil pan, lubricating oil pump, lubricating oil cooler, oil pressure valve, oil filter, main oil channel, crankshaft, connecting rod and camshaft bearings, tappet and tappet chambers, cylinder liners, valve levers and rocker arms.

- If necessary, clean engine room and oil pan with diesel fuel.
- Spray cleaned rooms with SAE 30W-30 preservative oil.
- Press running-in preservative oil into the lubricating oil circuit with a separate pump or pre-lubricating hand pump. Turn the motor by hand or electrical turning device so that all bearings and bearing bushes are wetted. The engine can also be turned with the starter without starting the engine.
- Remove cylinder head cover and spray valves, valve springs and rocker arms with SAE 30W-30 preservative oil.

In auxiliary equipment with its own oil filling (this includes exhaust gas turbochargers, regulators etc.) drain lubricating oil and fill in new lubricating oil according to manufacturer's instructions.

##### **Coolant system**

Fill the coolant system with a mixture of anti-corrosion agent with preservative properties (see section 5) and clean water and circulate with a third-party pump to form a new coating on the inner surfaces of the cooling system.

The duration of the conservation run and concentration of the corrosion protection agent must be carried out according to the manufacturer's instructions for the corrosion protection agent.

Then drain off the coolant.

**Combustion chamber**

Remove cylinder head cover and spark plugs. Bring the pistons to UT.

Use a spray lance to wet the accessible part of the cylinder liner with preservative oil through the opening.

+ Oil spills on the pistons are not permitted, if necessary remove by suction.

Then turn the engine until the piston is in TDC position and spray the cylinder liner from below with preservative oil.

**Intake air system, receiver tube**

Spray running-in preservative oil 30 W-30 into the receiver pipe and into the main starting pipe.

+ Oil spillages in pipes are not permitted, if necessary remove by suction.

## 3.2. Outside conservation

Before re-conserving, the engine must be thoroughly cleaned with detergent. Any corrosion deposits and paint damage must be removed.

**Bare outer surfaces and parts**

Coat or spray all bare spots with preservative.

Coat crankshaft flange with preservative and wrap or cover tightly with foil or packing linen.

**Control linkage and joints**

Coat control linkages and joints with grease against corrosion.

**Rubber parts**

Rub rubber parts with talcum powder.

+ Rubber parts must not come into contact with oil, grease or ink.

## **Engine openings**

All engine openings must again be covered with air and watertight covers to delay the volatilisation process of the preservatives.

The air inlet must be closed again to prevent the motor from being ventilated (chimney effect).

### **3.3. Storage and packaging**

After re-conservation, the motor must be stored in a dry, ventilated hall or covered again with a suitable cover. This must lie loosely against the motor so that the air can circulate around the motor so that no condensation can form. Use desiccant if necessary.

## **4. Deconservation**

Before starting, the engine must be de-conserved. The packaging must be removed and all covers of the closed openings removed. Any corrosion deposits and paint damage must be removed. Cleaning agents see section 5.

### **4.1. Deconservation of the interior**

#### **Lubricating oil system**

- If there is preservative oil in the oil pan, drain or pump it out.
- Fill the motor with the lubricating oil intended for operation. A flushing run is not necessary.
- Drain lubricating oil in auxiliary equipment with its own oil filling (this includes exhaust turbochargers, regulators, etc.) and fill in new lubricating oil according to manufacturer's instructions.

#### **Coolant system**

- If the preservative used is compatible with the cooling system preservative to be used, it can be filled directly into the coolant system as prescribed.
- If the compatibility of the preservative used with the cooling system protection agent to be used is not known beyond any doubt, a rinsing run with clear water of approx. 15 minutes duration is to be carried out before filling.

## 4.2. De-preservation of the outer parts

- Wash all surfaces and components coated with preservative with distillate fuel or a suitable cleaning agent.
- If necessary, wash off grooves from V-belt pulleys.

## 5. Preservatives/ cleaning agents

In the following we list some reference products about preservatives and cleaning agents to be used with which best results have been achieved. Equivalent products can be used, but the supplier must guarantee the suitability of the product for the application.

<b>Designation</b>	<b>Purpose</b>	<b>Designation / Supplier</b>
Distillate fuel	- Cleaning engine parts	Diesel according DIN EN 590
Running-in preservative oil	- Conservation of oil-bearing engine components	Running-in oil SAE30W-30 BP-MEK 30
Corrosion inhibitors	- Conservation of coolant systems	Puriton 3956
Corrosion inhibitor wax-like	- Conservation of bare outer surfaces and components	Gelserol Super
Protective grease	- For linkages and joints	Renolit MP2
Talcum powder	- For rubber parts	Talcum fine, white
Detergents	- To remove corrosion inhibitor	Eskapon S 255
Detergents/ Thinners	- To remove the waxy preservative	Renopal B150

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